

GRC Environmental Programs Manual

Chapter 30 - Non-Ionizing Radiation

NOTE: The current version to this Chapter will be maintained and approved by the Environmental Management Office ([EMO](#)). The revision date for this chapter is May 2001. If you are referencing paper copies, please verify that it is the most current version before use. Approved by: Environmental Management Office Chief: Michael Blotzer {<mailto:Michael.Blotzer@grc.nasa.gov>}.

PURPOSE

This chapter provides a summary of suitable criteria for human exposure to non-ionizing radiation. The standards and guidelines for measurements and biophysical interaction apply to all non-ionizing radiation sources **except lasers**. (*Reference to the Laser Radiation Protection Program Manual for laser radiation safety controls and requirements.*)

APPLICABILITY

The non-ionizing radiation protection guides apply to NASA Glenn and Plum Brook Station facilities.

DEFINITIONS

Electromagnetic Radiation

Natural or generated energy that moves through space

Electromagnetic Fields

Measurable field of energy that is produced by all devices and equipment that use or carry an electric current

Ionization

Stream of charged particles from the loss or gain of an electron

Microwave

One millionth part of an electromagnetic wave, used primarily as a source of thermal energy

Non-ionizing Radiation

Electromagnetic radiations which have long wavelengths and lack enough energy to produce ionizations

Power Density

Measurable quantity of an electromagnetic field

Ultraviolet Radiation

Light spectrum wavelengths from 0 to 400 nanometers

BACKGROUND

The Glenn Radiation Protection Program establishes the policies and procedures necessary for protection against exposure to high-intensity non-ionizing sources of radiation. Non-ionizing radiation sources are electromagnetic fields radio frequency field, ultraviolet radiation, microwaves and lasers.

POLICY

NASA Glenn uses the standards developed by the American National Standards Institute (ANSI), the American Conference of Governmental Industrial Hygienists (ACGIH) to protect employees against a variety of health effects that can be produced from exposure to high power density fields generated by non-ionizing

high power density fields generated by non-ionizing radiation sources. Laser radiation is covered in a separate manual, due to the level of hazard protection required, the variety of lasers, laser systems, types and classes in use.

REQUIREMENTS

Non-ionizing radiation emitters are evaluated to ensure that occupational exposure limits and exposure to the general public does not exceed specified guidelines and recommendations. The Health Physics Team maintains survey and monitoring instruments appropriate for the types of non-ionizing radiation sources and equipment being used in office and research environments.

The Glenn Radiation Protection Program Manual contains information on the hazards, safety controls and biological effects of non-ionizing radiation.

PROCEDURES

All facilities engaging in the use of non-ionizing radiation sources are required to have a safety permit.

A standard operating procedure, which includes the specifications for the non-ionizing source, should be sent to the Health Physics Team for review and approval.

Employees with concerns regarding sources of non-ionizing radiation or ultraviolet light, other than those being used in research facilities should contact the Senior Occupational Health Lead, in the Environmental Management Office.

RECORDS

Standard Operating Procedures for Test Facilities
Survey Data

REFERENCES

NASA Glenn Research Center Radiation Protection Program Manual
American National Standards
Institute of Electrical and Electronics Engineers
National Council on Radiation Protection & Measurements
American Conference of Governmental Industrial Hygienists Guides
National Institute for Occupational Safety & Health
Epidemiological Studies of Bioelectromagnetics (U.S., Canada, Russia)
Food & Drug Administration Publications

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